

signal in the forms of tones to the member user originally dialing the access number of the identified PTT private network —thereby indicating to the calling member user that at least one other member user has joined the identified PTT private network.

A PTT controller 504 is provided for according speaking privileges among the two or more member users joined to the identified PTT private network. In particular, the PTT controller 504 is responsive to PTT request signals, in the form of one or a combination of analog tones ("PTT tone requests"), generated by the telephones associated with the member users of the identified PTT private network. Each PTT tone request is generated at a member user's telephone either in response to manual engagement of a PTT switch, or in response to detected voice activity of the member user. A PTT tone request from a given member user is detected by the tone detector 498 assigned thereto, which then provides a PTT request signal to the PTT controller 504 over one of the output lines 500. In an exemplary embodiment the PTT controller 504 is operative to assign speaking privileges among requesting member users in the manner described above with reference to the PTT controller 104 (FIG. 2).

After a new active member user has been identified by the PTT controller 504 on the basis of the received PTT tone requests, the PTT controller 504 configures a multicast switch 510 to accept the reverse link voice or data information exclusively from the T1 channel 44 associated with the currently active member user. That is, the reverse link information from each of the other T1 channels, each of which has been assigned to one of the remaining (i.e., non-active) member users, is not multicast by the multicast switch 110. The PTT controller 504 also configures the multicast switch 504 to provide the reverse link information accepted from the newly identified active member user to the T1 channels associated with each non-active member user. Because PTT tone requests are transmitted only on the reverse links of non-active member users, such PTT tone requests advantageously do not interfere with the receipt of reverse link information from the active member user.

Although the forward links of each PTT private network are nominally used to carry voice or data information from the active member user to all other member users, the network controller 504 may also transmit system status information over the forward links during pauses or gaps in information transmission by the active member user. In an exemplary embodiment this system status information includes the following:

- (i) eligible member users (phone number, name, priority) of a given PTT private network,
- (ii) member users (phone number, name, priority) currently joined to the given PTT private network,
- (iii) the currently active member user (phone number, name, priority), and
- (iv) the queue of member users (phone number, name, priority, order of request) who have provided PTT tone requests to the PTT controller 490.

Such information could be transmitted using sequences of tones or tone combinations capable of being detected within the telephone of each member user. Various PTT private network information (i.e., member user lists, priorities) could be stored within the telephone of each member user, and specific entries retrieved for display upon receipt of the associated tone or tone combination from the network call manager 450. In this regard a land line telephone configured for use within a PTT private network orchestrated by the network call manager 450 is described immediately below with reference to FIG. 7.

Referring to FIG. 7, a block diagram is shown of a land line PTT telephone having transmit and receive sections 540 and 542 designed for communication using analog tones. During PTT operation, an input switch 548 is nominally set to pole 550 by PTT processor 552 so as to couple voice information from an input microphone 554 to the PSTN. However, when PTT switch 560 is engaged by the associated member user, the PTT processor 552 sets switch 548 to pole 562 and enables a tone generator 566. The allows the PTT tone requests generated by the tone generator 566 to be transmitted via the PSTN to the network call manager 450.

The receive section 542 includes a speaker 568, and an internal tone detector 570 for detecting analog tones or combinations thereof transmitted by the network call manager 450 during PTT mode operation. These tone or tone combinations may be used to convey a variety of status and control information to the PTT telephone of FIG. 7. In an exemplary embodiment this information may include:

- (i) identification of the currently active member user (name, priority),
- (ii) an indication that the member user associated with the PTT telephone has been accorded speaking privileges,
- (iii) notice that the speaking privileges of the member user associated with the PTT telephone are being revoked in favor of a member user of higher priority, and
- (iv) identification of the member users currently joined to the PTT private network.

Each tone or tone combination will have associated therewith a character string or other message stored within a display processor 574. In response to each detected tone or tone combination, the display processor 574 provides the associated message to an alphanumeric display 578. The control and status information enumerated above is intended to be merely exemplary, and in alternate embodiments other types of information may be provided to the PTT telephone by the network manager.

The previous description of the preferred embodiments is provided to enable any person skilled in the art to make or use the present invention. The various modifications to these embodiments will be readily apparent to those skilled in the art, and the generic principles defined herein may be applied to other embodiments without the use of the inventive faculty. Thus, the present invention is not intended to be limited to the embodiments shown herein but is to be accorded the widest scope consistent with the principles and novel features disclosed herein.

What is claimed is:

1. In a communication system in which users communicate through a switched telephone network, a private communication network for facilitating communication among a plurality of member user telephone sets said private communication network comprising:

a network call manager including:

- a telephone network interface for establishing a telephone connection with each of said plurality of member users over a plurality of channels of said switched telephone network, respectively,
- a switch matrix, coupled to said telephone network interface, for providing an information signal received by said telephone network interface over one of said plurality of channels simultaneously to a plurality of others of said channels via said telephone network interface, and
- a controller for configuring said switch matrix in response to talk request signals received over a selected one of said plurality of channels; and

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a plurality of eligible member user telephone sets disposed for simultaneous communication over said plurality of channels, each of said eligible member user telephones sets including means for generating one of said talk request signals, at least some of said eligible member user telephone sets being connected to the private communication network through a wireless communications system.

2. The private communication network of claim 1 wherein said controller means including means for identifying said selected one of said plurality of channels by choosing among ones of said talk request signals received over corresponding ones of said plurality of channels.

3. The private communication network of claim 1 wherein a selected one of said plurality of authorized telephone sets includes:

vocoder means for digitally processing input information in order to produce a sequence of vocoder data packets, and

modem means for generating said information signal using said vocoder data packets.

4. The private communication network of claim 3 wherein said modem means includes means for multiplexing said talk request signal with said vocoder data packets and for using the result during formation of said information signal.

5. The private communication network of claim 1 wherein said controller means includes means for verifying that said information signal received over said selected one of said plurality of channels was generated by a given one of said plurality of authorized telephone sets.

6. The private communication network of claim 5 wherein said controller means includes means for configuring said telephone network interface to call other ones of said authorized telephone sets subsequent to receipt by said network call manager of said information signal from said given one of said plurality authorized telephone sets.

7. The private communication network of claim 1 further including wireless network means for operatively coupling one of said plurality of authorized telephone sets to a corresponding one of said plurality of channels.

8. The private communication network of claim 1 wherein each of said plurality of authorized telephone set includes means for generating an encrypted signal by encrypting an information signal provided by one of said member users, said encrypted signal being transmitted over a corresponding one of said plurality of channels.

9. The private communication network of claim 8 wherein each of said plurality of authorized telephone sets includes means for recovering one of said information signals from one of said encrypted signals transmitted over a corresponding one of said channels.

10. In a communication system in which users communicate through a switched telephone network, a network call manager for facilitating private communication simultaneously among a plurality of member user telephone sets, at least some of said member user telephone sets being connected to the private communication network through a wireless communications system, said network call manager comprising:

a telephone network interface for establishing a telephone connection with each of a plurality of said member user telephone sets, including at least a plurality of said member user telephone sets that are connected to the private communication network through the wireless communications system, over a corresponding plurality of channels of said switched telephone network;

a switch matrix, coupled to said telephone network interface, for providing an information signal received over a selected one of said plurality of channels simul-

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taneously to other ones of said plurality of channels via said telephone network interface; and

controller means for configuring said switch matrix in response to control information received over at least one of said plurality of channels.

11. The network call manager of claim 10 wherein said controller means includes a controller for selecting said selected one of said plurality of channels in response to a talk request signal received over said selected one of said plurality of channels.

12. The network call manager of claim 11 further including wireless network means for establishing communication between at least one of said member users and said switched telephone network.

13. The network call manager of claim 12 wherein said controller means includes arbitration means for choosing said selected one of said plurality of channels on the basis of talk request signals received from ones of said member users over corresponding ones of said plurality of channels.

14. The network call manager of claim 13 wherein said controller means includes means for informing ones of said member users via corresponding ones of said plurality of channels of the identity of a selected member user providing said information signal over said selected one of said plurality of channels.

15. The network call manager of claim 14 wherein said controller means includes means for informing at least one of said member users via a corresponding one of said plurality of channels of the identities of ones of said member users associated with corresponding ones of said plurality of channels.

16. In a private communication network system in which users communicate through a switched telephone network, a method for facilitating private communication among a plurality of eligible member user telephone sets, at least some of said eligible member user telephone sets being connected to the private communication network through a wireless communications system, said method comprising the steps of:

establishing a telephone connection between a network call manager and each of a plurality of telephone channels of said switched telephone network, each of said plurality of telephone channels being associated with one of said plurality of eligible member user telephone sets;

providing an information signal received at said network call manager over a selected one of said plurality of telephone channels from an active one of said eligible member user telephone sets simultaneously to a plurality of other ones of said eligible member user telephone sets over other ones of said plurality of telephone channels;

generating talk request signals substantially simultaneously at a plurality of said eligible member telephone sets for transmission to said network call manager via said switched telephone network; and

choosing said active eligible member user telephone set on the basis of said talk request signals received at said network call manager.

17. The method of claim 16 further including the step of identifying said selected telephone channel by choosing among ones of said talk request signals received over corresponding ones of said plurality of telephone channels.

18. The method of claim 16 further including the steps of digitally processing information from said active member user in order to produce a sequence of vocoder data packets for modem transmission to said network call manager.

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19. The method of claim 16 further including the step of coupling said information signal from said active member user through a wireless communication network to said selected one of said plurality of telephone channels.

20. The method of claim 16 further including the steps of:  
 5 encrypting information signals generated within the one of said plurality of telephone sets associated with said active member user;

transmitting the encrypted information signals to said network call manager; and

10 decrypting the encrypted information signals received from said network call manager at the ones of said plurality of telephone sets associated with said other ones of said member users.

21. In a communication system in which users communicate through a switched telephone network, a private communication network for facilitating communication among a plurality of member user telephone sets, said private communication network comprising:

a network call manager including:

20 a telephone network interface for establishing a telephone connection with each of a plurality of telephone lines of said switched telephone network, each of said plurality of telephone lines being associated with one of said plurality of member user telephone sets,

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a switch matrix, coupled to said telephone network interface, for providing an information signal received over a selected one of said plurality of telephone lines simultaneously to other ones of said plurality of telephone lines via said telephone network interface, and

controller means for configuring said switch matrix in response to talk request signals received over said plurality of telephone lines; and

a plurality of eligible member user telephone sets, at least some of said eligible member user telephone sets being connected to the private communication network through a wireless communications system, disposed for simultaneous communication over said plurality of telephone lines, each of said eligible member user telephone sets including means for generating one of said talk request signals.

22. The private communication network of claim 21 wherein said controller means including means for identifying said selected telephone line by choosing among ones of said talk request signals received over corresponding ones of said plurality of telephone lines.

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